BISS Biodiversity Information Science and Standards

Biodiversity Information Science and Standards 3: e36234
doi: 10.3897/biss.3.36234

OPEN ACCESS

Conference Abstract

Semantic Interoperability Solutions for the Essential Variables: Focus on biodiversity

Pier Luigi Buttigieg[‡], Ramona Walls[§], Anne Thessen[|,¶,#]

‡ Alfred-Wegener-Institut für Polar und Meeresforschung, Bremen, Germany
§ CyVerse, Tucson, United States of America
| Oregon State University, Corvallis, United States of America
¶ The Ronin Institute for Independent Scholarship, Monclair, NJ, United States of America
# The Data Detektiv, Waltham, MA, United States of America

Corresponding author: Pier Luigi Buttigieg (pbuttigi@mpi-bremen.de)

Received: 15 May 2019 | Published: 18 Jun 2019

Citation: Buttigieg P, Walls R, Thessen A (2019) Semantic Interoperability Solutions for the Essential Variables: Focus on biodiversity. Biodiversity Information Science and Standards 3: e36234.
https://doi.org/10.3897/biss.3.36234

Abstract

The Earth system is enduring multiple, interacting stressors causing immense and irreversible change to its biosphere. The unprecedented magnitude of human influence on the planet is a cause for much concern, but also an opportunity to mitigate undesirable impact by instituting socio-ecological management strategies and monitoring their effectiveness. To do so, local and global policy developers and decision makers must have access to clear and globally consistent information streams that serve as planetary diagnostics. This need is being addressed by several international, multi-agency networks which have developed sets of "Essential Variables" (EVs) to improve consistency in the observation of key phenomena within their domains of operation. For example, the implementation of the Essential Climate Variables (ECVs) led by the Global Climate Observing System (GCOS) has set an example being followed in the marine and biodiversity domains by, respectively, the Global Ocean Observing System's (GOOS) Essential Ocean Variables (EOVs) and the Group on Earth Observation Biodiversity Observation Network (GEO BON)'s Essential Biodiversity Variables (EBVs). Each of these EV collections has a subset dedicated to biological and ecological phenomena. This is greatly encouraging for biodiversity science at large, but also runs the risk of parallel and conflicting developments occuring in the EV communities addressing thecross-cutting

© Buttigieg P et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

theme of biodiversity. As a consequence, there is an urgent need for these systems, and the communities behind them, to pursue tight conceptual and technical interoperability in aid of a coherent treatment of biodiversity in planetary-scale monitoring.

In this contribution, we will describe our current research and implementation of a semantic interoperability layer for the EVs, with a focus on biology and ecology. Applying the best practices and core infrastructure of the Open Biological and Biomedical Ontology (OBO) Foundry and Library, we have leveraged both mature and emerging reference ontologies targeting the domains of ecosystems and environment, population and communities, and high-level ecological phenomena. This interoperable collection of ontologies constitutes a foundation for highly expressive EV knowledge representation and management through robust, FAIR-compliant technologies. Further, we are coordinating these efforts with semantic technology adopted by UN agencies, representing global directives and indicators of the UN Sustainable Development Agenda for 2030. With open editorial models behind each of these ontologies, we aim to offer a scalable and inclusive system to bridge data and information products across the EVs through machine-accessible knowledge representation.

Keywords

ontology, essential variables, observatory, semantics, FAIR, interoperability, sustainable development

Presenting author

Pier Luigi Buttigieg

Presented at

Biodiversity_Next 2019

Funding program

PLB's contribution to this work is funded by the HGF Infrastructure Programme FRAM of the Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung

Conflicts of interest

None